



EVMPC1100A-54-00A

High-Efficiency, Non-Isolated Fixed Ratio, 300W, Digital DC/DC Power Module Evaluation Board

NOT RECOMMENDED FOR NEW DESIGNS, REFER TO EVMPC1100C-54-00A

DESCRIPTION

The EVMPC1100A-54-00A is an evaluation board designed to demonstrate the capabilities of the MPC1100A-54-0000, a high-efficiency, monolithic, non-isolated LLC/DCX power card module with a fixed 10:1 transformer turn ratio.

The evaluation board can deliver 60A of continuous load current across a wide operating input range. High efficiency can be achieved across a wide output current load range.

The MPC1100A-54-0000 employs MPS's MP2981 (a digital LLC controller) and MP8500 (a smart synchronous rectifier).

The MPC1100A-54-0000 is available in a surface-mount (27mmx18mmx6mm) package.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage	V_{IN}	40 to 60	V
Output voltage	V_{OUT}	4 to 6	V
Output current	I_{OUT}	60	A

FEATURES

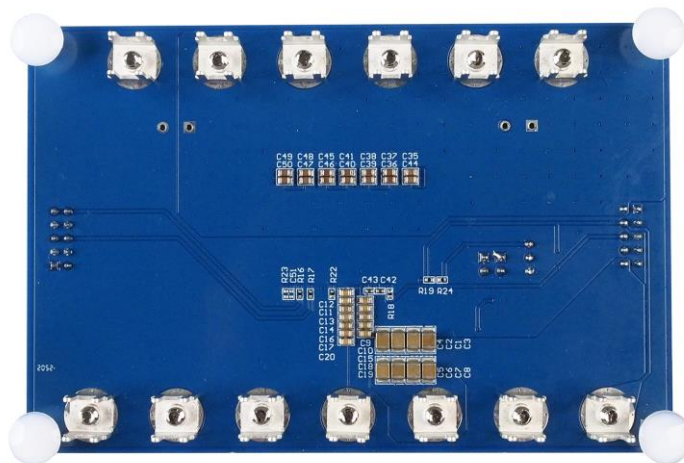
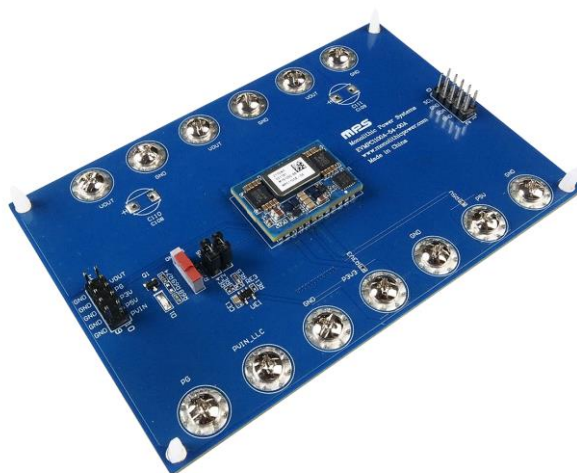
- Up to 60A Continuous Secondary Current
- PMBus/I²C Compliant
- Built-In MPT to Store Custom Configurations
- Input Voltage, Output Voltage, Output Current, Output Power, and Temperature Monitoring
- V_{IN} Under-Voltage Lockout (UVLO), Output Over-Voltage Protection (OVP) and Under-Voltage Protection (UVP), OCP_TDC/OCP_SPIKE Protections, and Over-Temperature Protection (OTP)
- Available in a Surface-Mount (27mmx18mmx6mm) Package

APPLICATIONS

- Datacenters
- DC Power Distribution
- High-End Computing Systems

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EVMPC1100A-54-00A EVALUATION BOARD



(LxW) 120mmx80mm

Board Number	MPS IC Number
EVMPC1100A-54-00A	MPC1100A-54-0000



QUICK START GUIDE

The evaluation board has a 40V to 60V input voltage. Follow the steps below to turn the evaluation board on and off.

Turning the Evaluation Board On

1. Test the impedance from the input (PVIN_LL) to GND, power supply (P5V, P3V3) to GND, and the output (VOUT) to GND. Ensure that they are not shorted to GND.
2. Ensure that there is a shorted jumper on P5.
3. Turn EN_SW off.
4. Turn the VIN, 5V, and 3.3V DC supplies off. Set the e-load of the output to “No Load.”
5. Connect the VIN supply (40V to 60V) to PVIN_LL and GND.
6. Connect the 5V supply to P5V and GND. Connect the 3.3V supply to P3V3 and GND.
7. Connect the e-load to the VOUT and GND connectors.
8. Complete the power-on sequence using the steps below:
 - a. Turn the 5V supply on.
 - b. Turn the 3.3V supply on.
 - c. Turn the VIN supply on.
9. Turn EN_SW on. The board should start up automatically.

Turning the Evaluation Board Off

1. Set the e-load to “No Load.”
2. Switch EN_SW to the off state.
3. Turn the VIN supply, 5V supply, then the 3.3V supply off. The MPC1100A-54-0000 should shut down automatically.

EVALUATION BOARD SCHEMATIC

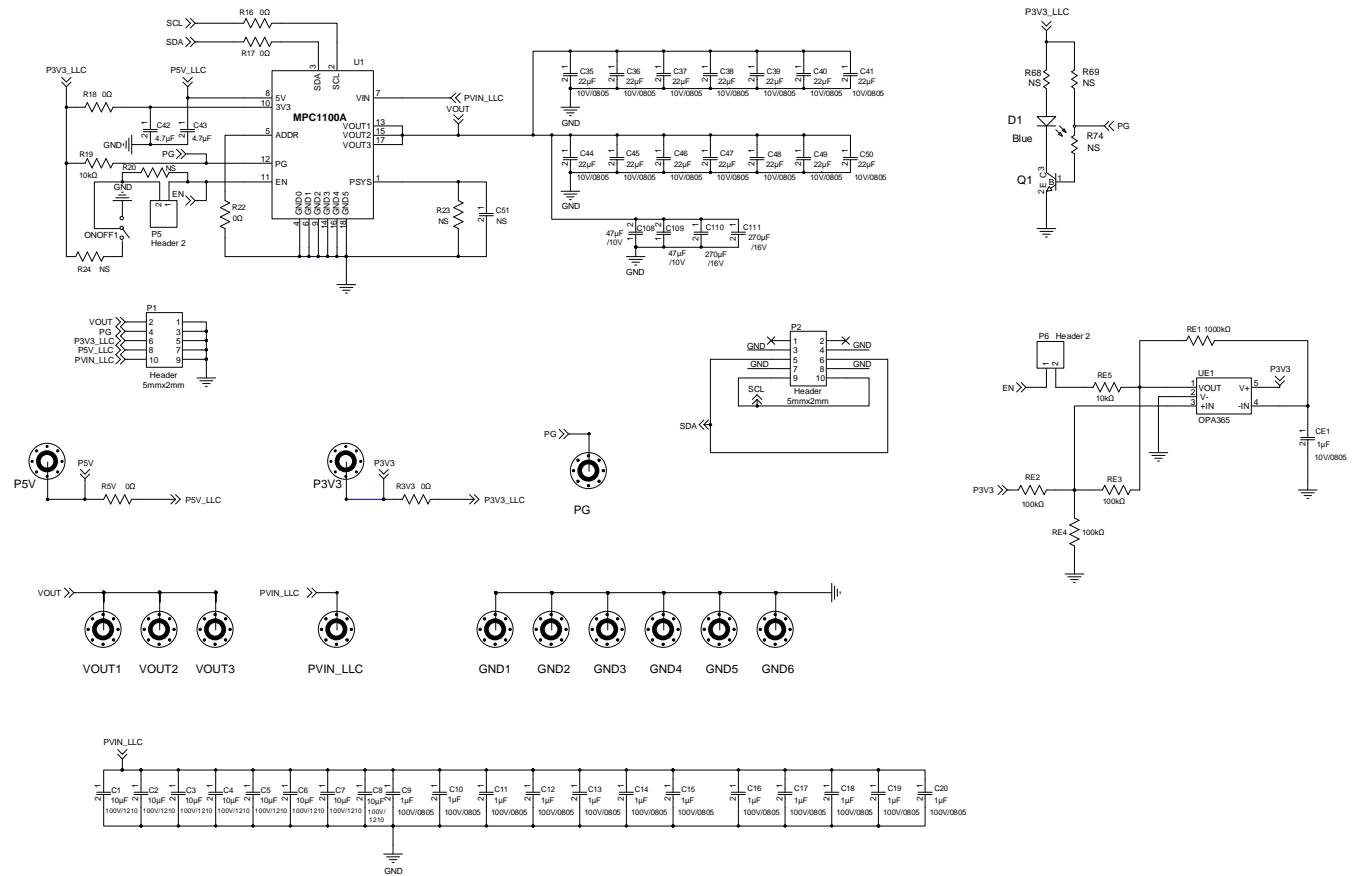


Figure 1: Evaluation Board Schematic

EVMP1100A-54-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
12	C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20	1µF	Ceramic capacitor, 100V, X7S	0805	Murata	GRM21BC72A105KE01L
8	C1, C2, C3, C4, C5, C6, C7, C8	10µF	Ceramic capacitor, 100V, X7S	1210	Murata	GRM32EC72A106KE05L
14	C35, C36, C37, C38, C39, C40, C41, C44, C45, C46, C47, C48, C49, C50	22µF	Ceramic capacitor, 10V, X7S	0805	TDK	C2012X7S1A226M
1	CE1	1µF	Ceramic Capacitor, 10V, X7R	0805	Murata	GRM21BR71A105KA01L
2	C42, C43	2.2µF	Capacity, 10V, X6S	0402	Murata	GRM155C81A225ME44D
1	D1	Blue	LED	0805	Honglitronic	HL-PSC-2012H203BC
1	ONOFF1	12V	3-pin jumper switch	DIP	Wurth	450301014042
2	P1, P2	2.54mm	Header, 5-pin, dual row	12.7mmx 5.08mm	Wurth	61301021121
2	P5, P6	2.54mm	Header, 2-pin	5.08mmx 2.54mm	Wurth	61300411121
1	Q1	40V	Transistor	SOT23	On Semi	MMBT3904LT1G
6	R3V3, R5V, R16, R17, R18, R22	0Ω	Resistor, 1%, 1/16W	0402	Yageo	RC0402FR-070RL
2	R19, R24	10kΩ	Resistor, 1%, 1/16W	0402	Yageo	RC0402FR-0710KL
3	RE2, RE3, RE4	100kΩ	Resistor, 5%, 1/16W	0402	BDY	0402-J0104TCE
1	RE1	1000kΩ	Resistor, 5%, 1/16W	0402	Yageo	RC0402JR-071ML
1	RE5	10kΩ	Resistor, 5%	0603	Yageo	RC0603JR-0710K
1	R68	2kΩ	Resistor, 1%, 1/16W	0603	Yageo	RC0603FR-072KL
1	R74	240kΩ	Resistor, 1%, 1/16W	0603	Yageo	RC0603FR-07240KL
1	UE1	4.6mA	Operational amplifier	SOT23-5	TI	OPA365AIDBVR
1	U1	MPC1100A	High-efficiency, non-isolated LLC/DCX power card module	Surface-mount (27mmx 18mmx 6mm)	MPS	MPC1100A-54-0000

EVB TEST RESULTS

Performance waveforms are tested on the EVMPC1100A-54-00A evaluation board. $V_{IN} = 54V$, $V_{OUT} = 5.4V$, $T_A = 25^{\circ}C$, unless otherwise noted.

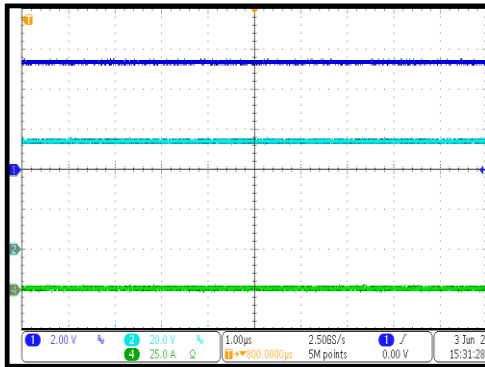
Steady State

$V_{IN} = 54V$, $I_{OUT} = 0A$

CH1: V_{OUT}

CH2: V_{IN}

CH4: I_{OUT}



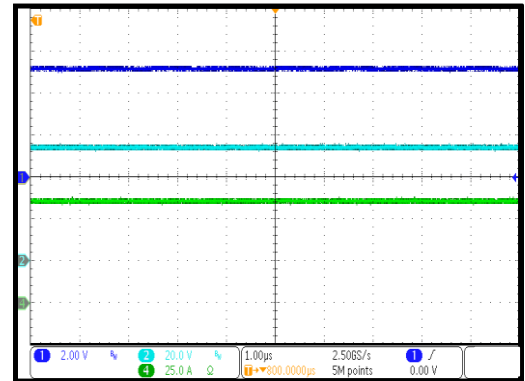
Steady State

$V_{IN} = 54V$, $I_{OUT} = 60A$

CH1: V_{OUT}

CH2: V_{IN}

CH4: I_{OUT}



Start-Up through EN

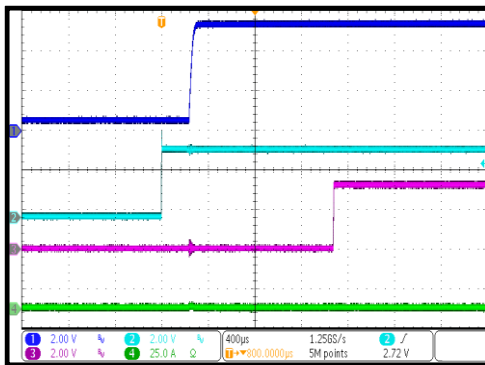
$V_{IN} = 54V$, $I_{OUT} = 0A$

CH1: V_{OUT}

CH2: V_{EN}

CH3: PG

CH4: I_{OUT}



Start-Up through EN

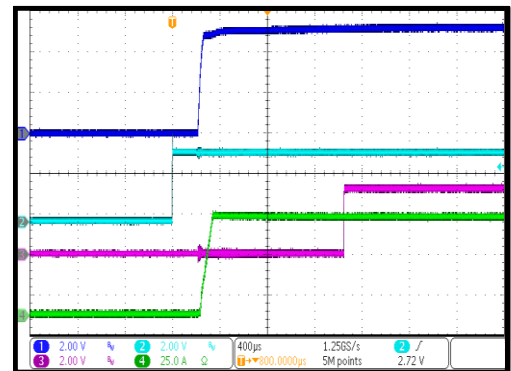
$V_{IN} = 54V$, $I_{OUT} = 60A$

CH1: V_{OUT}

CH2: V_{EN}

CH3: PG

CH4: I_{OUT}



PCB LAYOUT

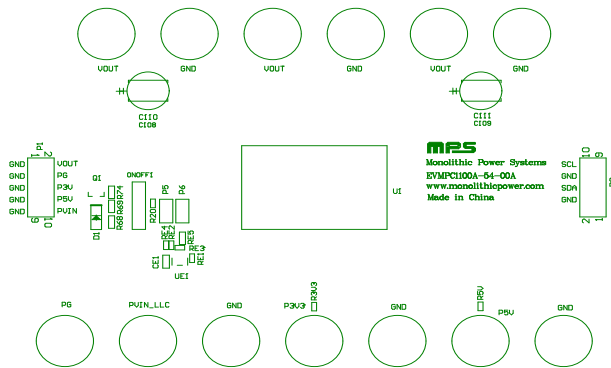


Figure 2: Top Silk

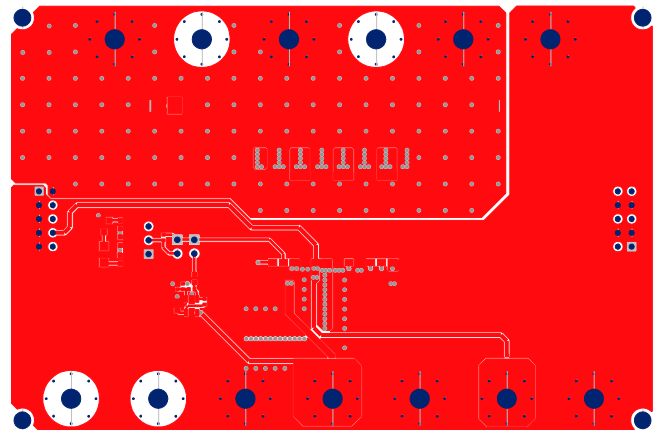


Figure 3: Top Layer

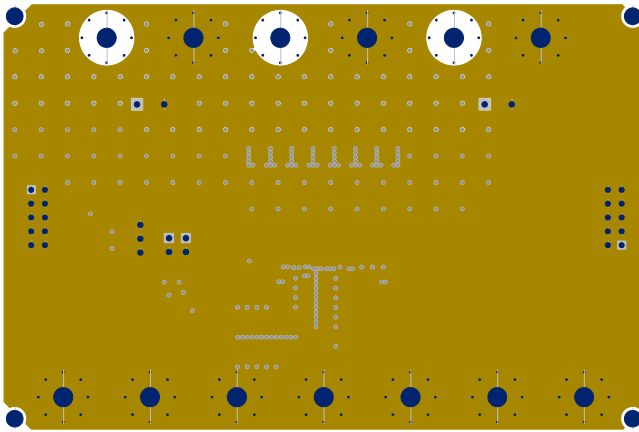


Figure 4: Mid-Layer 1

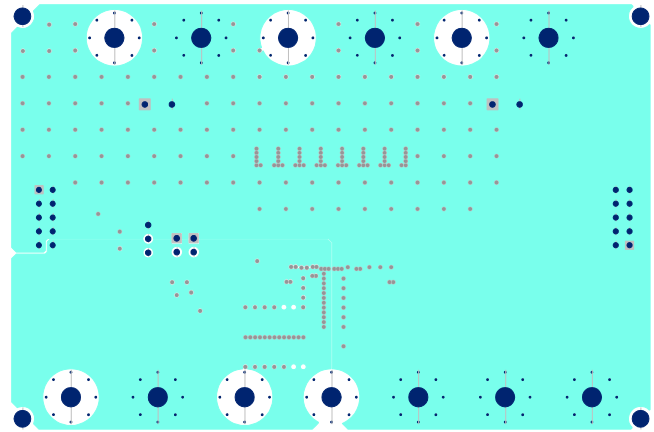


Figure 5: Mid-Layer 2

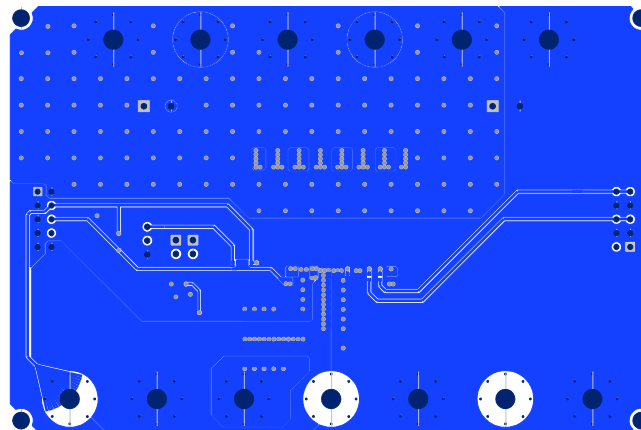


Figure 6: Bottom Layer

**REVISION HISTORY**

Revision #	Revision Date	Description	Pages Updated
1.0	06/10/2021	Initial Release	-

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